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A

DISSERTATION

On the METHOD of

INOCULATING

THE

SMALL-POX;

WITH

Critical Remarks

On the several AUTHORS who
have treated of this DISEASE.

By J. C. M. D.

Printed for T. Bickerton at the Crown in
Pater-Noster-Row. 1721
(Price 1s.)

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Printed for J. Richardson at the Crown in
St. Martin's Lane, 1751.
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A

DISSERTATION

ON THE

Method of Inoculating, &c.



Tender Regard for the
Health and Beauty
of all ; but especially
of the more agreeable
Part of the Creation, I
mean the Fair Sex, has at all times
been a sufficient Motive for Physicians
to contrive Methods of Cure proper
for such Diseases as either impair the
one, or are detrimental to the other.
But particularly for the Small-Pox,

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which

which too often prove entirely destructive to both. Tho' the various Attempts of this kind now in practice have proved, and still continue to be of admirable Service to the Publick ; Yet this foul and loathsome Distemper still rages, and daily shews dismal Instances of its irresistible power. This Truth, which I am apt to believe will be readily acknowledged by all, seems to me to be a Reason cogent enough to engage all to have Recourse to another, I mean the Method of Inoculating or Transplanting this Disease ; which in other Countries is practic'd with surprizing Success, but has met with such ill Reception here, as to be known even by Name, but by a few in this.

THAT the Nature of this Disorder, the Danger that attends it, the ill Success of all other Methods, and the Reasonableness and Advantage of this may appear in the fairer Light, I will propose, *First*, A Short History of the Small-Pox, and the several Consequences

ces that generally ensue upon those who have been affected with this Disease, even after it has been cured, extracted from the *Arabian* and *English* Authors, particularly the Judicious Dr. Sydenham, and others. Secondly, The various Methods now in Use; and, Thirdly, An Account of the Manner of Inoculating, as practised abroad, as also the Causes of this Depuration of the Blood, and the wonderful Success which has always been observed to ensue upon this Practice.

THE Small-Pox are either *Epidemical*, depending upon a particular Constitution of the Air generally seizing at the same time all such as have not been affected with this Disorder before; or *Contagious*, being communicated, by the *Morbifick Effluvia* that arise from the affected Patient, to others within the Sphere of their Activity, whose Bodies are susceptible of their Impression and Influence. They invade in any Season of the Year; but especially in *Spring* and *Summer*.

In *Autumn* they are of a milder Constitution and upon the Decline; but the sooner they appear in *Winter*, they are of a more Malignant Nature. They principally seize Children, and are of two different sorts, viz. The *Distinct*, and the *Confluent*; the latter of which are attended with the greater Danger, as having a Variety of Symptoms, which are not found in the other sort, and those too of a more perplexing Nature. The Course of the Disorder in both sorts consists of four different Periods, viz. The *Invasion*, *Eruption*, *Maturation* and *Exsiccation*; all which are sooner run over in the *Distinct* than in the *Confluent* kind.

WHEN either invades, the Patient is immediately seized with a Shivering and Shaking; followed by an acute, feverish Heat, attended with a white Tongue, Thirst, Loss of Appetite, Drowsiness and Heaviness of the Head and Eyes; a sharp Humour irritates his Nose, on which Account he often sneezes, and his Eyes itch, and are waterish.

waterish. His Eye-lids appear swollen, he vomits frequently, has a dry Cough, and difficult Respiration; he feels violent pains in his Head, Back, Loyns, and at the Pit of his Stomach if it be press'd with his Hand; his Pulse is quick and high, his Countenance flush'd and florid, his Urine sometimes, as in an healthful State, but generally crude and turbid, and his Blood, which at this time is extravasated, appears Pleuretic. Convulsive Fits in Children prognosticate an immediate Eruption, unless they arise from the difficult Breeding of their Teeth. They who are affected with the *Distinct* Pox have a great propensity to Sweat, which is peculiar to this Sort, and in the *Confluent*, the Eruption is preceded by a Looseness, which is seldom or never to be observ'd in the *Distinct*. The Symptoms now mention'd encrease from the first Invasion, and continue till the Eruption, but with unequal vehemence in the different Sorts: For in the *Distinct* they are of a milder Nature, but in the *Conflu-*

Confluent, the Fever, Sickness, Restlessness and Vomitings are very violent, and generally remain two or three Days after.

THE Eruption in the *Distinct* commonly happens upon the fourth Day after the first Invasion, and seldom later; but those of the *Flux-kind* make their Appearance on the third, very often sooner, but seldom or never on the fourth, unless it be when they are retarded by the violent pains and the other extravagant Symptoms that affect the Patient. In the *Distinct-kind* small Pimples appear here and there, especially in the Face, Neck and Breast, and gradually over the whole Body, which daily encrease in Height and Bigness. At first they are red, afterwards they become Chrystalline, and by degrees pale and yellowish at the top, till the time of their Maturity. By these the Skin and Flesh adjacent are inflam'd with great pain and tumified. The Eye-lids become so swollen that they close, and thereby the Patient is deprived

deprived of Sight, which generally happens on the *eighth Day*, the which is to be particularly observed in this sort. After this, in proportion to the Number of the Pustles, the Hands, Fingers and other parts are seized with an Inflammation and Tumour, which diminish on the *eleventh*, for at this time the *Distinct* are at their full Maturity. From this, they gradually dry up to the fourteenth or fifteenth, wherein all, except those on the Hands, fall off. After the Pustles, Scurffy Scales arise, which sometimes, but very seldom leave some Impressions or Pits behind.

THE *Confluent* at the time of their Eruption, appear sometimes like the *Erysipelas*, and sometimes like the Meazles. In this sort the Pustles do not arise so high as in the *Distinct*, they are small in the Face and Trunk; but become larger the nearer they approach to the Extremities. In the Face they are connected with, or run into one another; insomuch that it appears as covered with a red Bladder. After
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the Expiration of the *eighth Day*, the Skin, which before was smooth, gradually becomes rougher, and the Pustles of a more dusky or dark Colour till the time of their Maturity : After this they dry and fall off, which happens in respect of time according to the Severity of the Pox ; for, where they have been violent, the Face is not altogether freed till after the twenty third or twenty fourth Day. When the Pustles have fallen away, Scurffy Scales succeed, which, are of such a Corrosive Nature as to leave deep Pock-Holes, and often unseemly Scars, Contractions of the Skin, and Seams hind.

In both sorts the Fever is at the highest from the first Invasion after the Eruption, it gradually declines till the Maturity and then totally vanishes ; but upon the Exsiccation a new Fever begins to appear, particularly in the Confluent-kind. In the Distinct-kind the Symptoms, that affected the Patient at the Invasion, immediately cease up-
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on the Eruption ; but in Confluent although they be more moderate, yet they continue several Days after. In the Course of this Disease, when the Pustles of the Confluent sort begin to dry, a Salivation arises in Adults, and a Looseness in Children. The former is a constant Attendant upon this Disease ; but the latter has not been so generally observed.

THE Symptoms of the most dangerous Consequence that arise in the Course of this Disease, are, If on the eighth Day in the Distinct kind the Swelling and Redness of the Face and Hands, as also the Sweat, which all along perspir'd from the Patient, cease on a sudden : If upon this he becomes Delirious and Restless ; and if he urines often and little at a time ; for these prognosticate immediate Death. If in the Confluent, the Salivation ceases entirely on the eleventh, without a return, and without a Continuance of the Swelling in the Face, or a manifest Appearance of a beginning

ning Swelling of the Hands. If the Matter which should be discharged by Salivation becomes so viscid that it cannot be evacuated, upon which fear of Suffocation, a difficult Respiration, and uneasy Deglutition arise: for in these Cases, the Patient quickly retires to another Life.

IF in either the Confluent or Distinct, the Fever be violent through the whole Course of the Disease; if there be a Difficulty of Respiration, a Phrenzy or Coma; if there be purple, livid, or black Spots either between or upon the Tops of the Pustles, and if upon their Eruption they immediately disappear. If the Matter contained in the Pustles be of a Gangrenous Nature, or if a Mortification arises in the Parts. If there be an Hæmorrhage of the Nose, an immoderate and sudden *Flux* of the *Catamenia*, an *Hæmoptosis*, Bloody Urine, a Micturition, or total Suppression of Urine in young People. If the Pustles on a sudden become flat, and if a Looseness arises in Adults.

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THE Rules for judging in this Disorder are as follow: The Disease, in it self, is not of a Malignant Nature; for if there be no ill Management, it generally runs thro' the different Periods without any considerable Danger, and commonly terminates in Health, but sometimes in Death, or another Disease. In the *Distinct-kind*, the *Eighth day*, and in the *Confluent*, the *Eleventh* are principally to be regarded, for according to the Nature of the Symptoms that arise on these Days, such must be the Determinations which are made in respect of the Life or Death of the Patient. The kind and degree of Malignity of this Disease must be determined according the Appearance of the Pustles in the Face. If upon the Invasion of the Disease, the Symptoms be not very violent, we have great reason to expect that the other different Periods will be favourable, and *vice versa*. For the most part the slower the Eruption of the Pustles is, the more favourable we find the Disorder.

The fewer, softer, rounder, more pointed at the top, more distinct, greater, whiter, and in the Course of Maturation, the yellower, and the more remote the Pustles are from the Face, the better Event is to be expected. The more they are in Number, especially in the Face; the less in Magnitude, the sharper and more Ichorous the Matter contained in them is, the more they flux and cohere together, the browner and the blacker they are, and the sooner their Eruption is, they are so much the more Malignant. The hotter, redder, and more tumid the Interstices between the Pustles are, at the time of Maturation, the greater are the Hopes; but the paler, browner and more flaccid they appear, so much the worse; for upon these a *Quinsy*, or Mortal *Peripneumony* invades the Patient. This Disease is less dangerous in Women, Children, and such as are of a soft, phlegmatic and lax Disposition of Body, than in old People, and such as have been accustomed

tomed to hard Labour. If the external Habit be only affected, the Event is less dangerous ; But if the Jaws, Gullet, Ventricle, Intestines and the other internal Parts be seized by the Pustles, the Danger will be the greater.

THE Disorders or dismal Effects this Disease leaves behind, after it has run thro' its different Stages, are these that follow ; viz. deep Pits, or Pock-holes, Contractions of the Skin, and unseemly Scars and Seams in the Face. Pearls, Weakness and Inflammations of the Eyes ; as also Dimness of Sight, and often total Blindness. Convulsive, Epileptic and Apoplectic Fits, Tumours or Apostems in several Parts of the Body ; an *Asthma*, Pleurisy, *Peripneumony*, or Inflammation of the Lungs, a *Phthisis* or Consumption, and very often a Cachectic, or ill Habit of Body, by means of which, the Patient is rendered unhappy through the whole remaining portion of his Life.

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WHEN we proceed to make Enquiries after the Original of this Disorder, we find that it is but a new Disease, and of a late Date, for we cannot discover any Description of it transmitted to us by any of the Ancients, which I take to be an undeniable Argument that it never appeared among them. For it cannot be suppos'd that they who were so very diligent in making Observations on Diseases, should not leave us any History of this, which makes such a considerable Figure in the Catalogue of Distempers. Besides, 'tis evident that at this Day 'tis entirely unknown in several parts of the World; and that in the *West-Indies* it was never heard of till the *Spaniards* convey'd it thither some few Years ago, at which time the Infection was of such dismal Consequence, that (the proper Method of managing this Distemper not being known) whole Nations fell a Sacrifice to its Fury. The first who delivered us any account of this Disease were the *Arabians*, whose Observations both as to
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the History, Cause and Method of Cure, are so accurate and just, that our modern Authors have made but very small Improvements in any of the *Three*. If any who have not as yet been conversant in their Writings, makes the least doubt of the truth of this Assertion, let him but imploy some small time in the perusal of *MESUE*, *RAZES* and *AVICENNA*, and he'll be immediately convinced that there are sufficient Grounds for what is here affirm'd. I am not insensible that *Zucatus Lusitanus* has taken no small pains to oppose what is here advanced; but the places he produces from *Hippocrates*, *Galen* and *Celsus*, are so very foreign to the purpose for which he has design'd them, that they need not any particular Refutation. If any is desirous of seeing what is proposed, he may consult *Question II. de Medicor. Princip. Hist. Lib. 2.*

WE proceed to examine the Methods of Cure now in practice; of these some may be termed General, being
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adher'd to, thro' the whole Course of the Disorder: Others are particular, as being adapted to some certain Circumstances that now and then occur. Of the *General* there are four, the two first of which are distinguished by the Name of the *Cool* and the *Hot Regimen*: The former of these is recommended by the Judicious *Sydenham*, often approved by practice, and is such as may be supported by substantial Reasons. The latter is espous'd and approv'd by all the old Women and Nurses in the City, as also recommended by *Dr. Morton*, *Lifter*, and a considerable Number of Learned Physicians, who maintain that it is most advisable constantly to pursue this Method, in order to drive the *Pox* from the Heart, as the old Women express it; or according to the Physicians, to expel the *Morbific* and *Malignant* particles from the Internal to the External parts. Notwithstanding these different Methods seem to be in a direct Apposition one to another, yet good Success

Success often attends the one as well as the other, when duly circumstanced and regulated by a skilful Hand; and as ill Consequences arise from each, when injudiciously put in practice by such as are ignorant of the real Case of the Patient, and consequently incapable to propose a Method proper for the Cure. But in reality it must be allowed, that an imprudent Use of the *Hot Regimen* is much more dangerous and fatal than that of the *Cool*; the former by allaying the Fervour of the Blood, and abating the Tension of the Vessels, must of necessity assist the Expulsion of the morbidick Matter, and prevent a Variety of destructive Symptoms that might arise, and is therefore very proper in an acute and continual Fever; the latter, which consists in a Choice of gentle *Diaphoretics*, is of no less Service when the Motion of the Blood is too slow, when the Spirits are too languid, when the Vessels have not a sufficient Spring or Elasticity, or lastly, when by Neglect or an improper

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Use of the *Cool Regimen*, the due Expulsion of the morbidick Matter is prevented, upon which direful Symptoms appear, which, unless timely opposed, hurry the Patient to the other World.

THE third general Method is that which is propoed by Dr. *Boerhaave*, present Professor in the University of *Leiden*: This truly Learned and Judicious Gentleman considering the *Small Pox*, as an acute and continual Fever, whose Pustles are only a critical Discharge of the morbidick Matter, esteems it no ways necessary to wait the different periods of this Disease; but upon the first Invasion, recommends immediately proper Evacuations, such as *Venaesection*, *Vomits*, and *Laxatives*, as also the *Cooling Regimen* prescrib'd in other acute Cases, by which he prevents the Eruption of the Pustles, and the other consequent Stages. But with all due Deference to the Judgment of so great a Man, if I am not very much mistaken, this Method of his is Mal-practice, as it exposes the Patient
to

to prodigious Hazards ; *First*, Because there is a sudden and contrary Motion introduced in the Fluids, and entirely opposite to the Direction of Nature, and the Genius of the Distemper, which procedure has generally been observed to be very detrimental to the Humane Frame, and always disallowed by the Masters of our Art. For since Physicians are the Assistants of Nature, it is their Business to support, and not to thwart her in her Operations, unless they find that they tend either to the Destruction or ill Habit of the Body. *Secondly*, Because by this Method he renders his Patients subject to repeated Assaults of the same Disease. For since there is, as will be demonstrated, a latent *Seminium* of the pocky Matter, in the Solids and Fluids of the Body ; and since 'tis impossible to think that there can be a due Separation and Discharge of the Seeds by this Method ; his Patient must unavoidably be liable to the Attacks of this same Disease whenever the particular Constitution of the

Air, in which the *Small Pox* is *Epidemical*, happens to be predominant, or when his Patient is within the Sphere of Activity possessed by the Contagious *Effluvia* that arise from an infected Body: For supposing the *same* Cause acting, the *same* Force with which it acts, and the *same* Disposition of Body upon which it does act, it necessarily follows that the *same* Effect must constantly be produced.

THE *Fourth* and last general Method is the *Oleose Regimen*, invented, recommended and defended by the learned Dr. *Woodward* of *Gresham College*: The Sum of his Doctrine is, that this Disease takes its Rise from the *Biliose Salts*, and that the Seat of these is in the Stomach, wherefore he prescribes Vomits and Glysters to carry off part of the Saline Particles, as also large Quantities of Oyls to dilute, blunt and cramp the remaining Salts. So much being lately published in Opposition to, and in Defence of this *Hypothesis*, I think it no way necessary to insist upon

upon it here, but refer the Reader to the several Papers that have been writ upon this Head.

THE particular Methods proposed to relieve the Patient, when sinking under the Violence of the *Confluent kind*, namely, when Spitting is stopp'd, and the Swelling of the Face is abated, and when a new Fever arises in the beginning of the Exsiccation, are these that follow ; viz. *First, A Mercurial Ptyalism*, proposed, recommended and practis'd by the late learned and ingenious *Pitcairne*. That this may be a very considerable Service is plain and obvious to Humane Reason, in that it is the very Method pursued by Nature, in that a considerable Discharge is hereby made, and in that the Tumour of the Face is again rais'd and continued for a due time ; the Advantages resulting from which are easily discoverable by the History of this Disease. However this is such a Method as is only to be used by the Judicious, and those who are knowing
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in their Art, but never to be brought into practice by ignorant Pretenders, Quacks and Empiricks ; for if all Circumstances be not duly observ'd, 'tis only a Sword in a mad Man's Hand, carrying along with it immediate Death and Destruction. The *Second* is, The Method of *Purgation*, practised and defended by the Celebrated Dr. *Freind*, Dr. *Mead*, and others ; but strenuously opposed by Dr. *Woodward*. Since this Practice has been so much canvass'd by other Hands, 'tis no way necessary for me to enlarge upon the Matter, but all that I shall say is, that the same Judgment may be made of this, as the former ; that in dangerous Cases such Methods are abundantly more allowable and praiseworthy, than stupid Resignation and total Despair. And *Lastly*, That there are a Variety of Instances, sufficiently evidencing, that this Method, and this alone, when several other Means frustrated Expectation, has prov'd effectual in the Preservation of Life :
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Wherefore against this Method, which is thus supported by Matter of Fact, there cannot be any substantial Reason. The other Attempts in Practice being of no considerable Note, deserve not any particular Observation ; I shall therefore put an end to this Part, with the following *Aphorism*, namely ; That all Attempts, or external Applications made use of to secure the Face from *Pock-Holes, Seams, Scars, and Contractions of the Skin*, generally prove the Occasion that these very Disorders become so considerable.

I now come in the second place to propose the *Method of Inoculation*, and the *Causes of this Disease*. In the *Eastern Countries*, and such as are very much exposed to the Influence of the Sun, the *Small-Pox* being generally *Epidemical*, and very malignant, insomuch that vast Crouds are yearly swept away by their Violence, set all, both Learned and Ignorant, to practice a Variety of Ways, that they might with more Safety and Expedition, either curb or
prevent

prevent their destructive Influence. At last, whether by Chance, Deduction of Reason, or Experiment is not certainly known, they happily fell in with the *Method of Inoculation*. The Author of this is not transmitted down to us in such a manner as we may depend upon the Relation: but to supply this Defect, there are not wanting several who lay claim to the Praise. That it first proceeded from some of the Populace, who were neither Men of Fortune, Character nor Learning, seems to me to be very probable, in that it appear'd in the World, without the least Recommendation from any of the Learned, and met with very considerable Opposition from the Rich. In several Parts of *Greece*, the Vulgar had it practiced upon them; and from time to time it prevailed more and more, till at last it was approved of and receiv'd in *Thessaly*, and the adjacent Parts. The *Turks* and other unlearn'd and barbarous People, at first declar'd very much against

gainst the Practice; but at present being convinc'd by the Consequences that attended, they readily admit of the Operation, and are as industrious in giving it a due Recommendation as any others. The *Italians* also being apprised of the Method and the Success consequent upon it, constantly employ an Operator in an *Epidemical* Season, and thereby prevent a great Number of Inconveniencies that might otherwise ensue; and to come nearer home, I have had it very well attested to me, that a certain Gentleman of this City had the Operation perform'd upon two of his Children this last Winter; and that his Expectations were fully answered in the Event.

THE Method of the Operation as it is practis'd in *Theffaly*, *Constantinople* and *Venice* is, as follows: In the beginning of Winter, or Spring, when the *Small-Pox* happen to be *Epidemical*, a proper Subject is chosen from whom the Pocky Matter is to be taken, and this is generally a Boy of twelve or fourteen, or a

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Youth who is affected either by Contagion, or the Disposition of the Air, and labours under the Pox which is of the *Distinct kind*. Some of the Pustles upon his Legs and Thighs are opened on the Twelfth or Thirteenth Day, at which time the Pox are at their full Maturity. The Pus is press'd out into some small Vessel, which has been well cleans'd with warm Water: This is covered and kept warm in the Bearer's Bosom, till such time as 'tis convey'd unto the Person upon whom the Operation is made. After his Body has been duly prepared by the Directions of a Judicious Physician, according to his particular Constitution, and the Nature of the Disease which is to be *Transplanted*; He retires to his Chamber, which is ordered to be kept neither too warm nor too cold, and there waits the Performance of the Operation. After all Matters have been thus adjusted, the Operator pierces cross-ways, or obliquely, the Muscular

cular Parts, particularly the Arms, Legs and Thighs with a Launcet or Three-edg'd Needle, till such time as the Blood flows, and separates the Skin from the Parts beneath; into these Wounds the Operator drops a little of the Pus, which all this while has been kept warm, takes due Care to intermix this Morbifick Matter with the flowing Blood by the Assistance of some pointed Instrument, and immediately covers the Wounds with half a Nut-shell, or some such Concave thing, and fixes it thereon with proper Bandages for the space of Twelve or Fourteen Hours, in Order to prevent the Cloaths or any Accident from rubbing upon the Parts, and wiping away the Pus before it has entred the Vessels, and been intermix'd with the Mass of Blood.

T H E R E are some who prick the Forehead, Cheeks and Chin; as also the Backs of the Hands, the Wrists

and the *Metatarsus*: But these being very sensible, and consequently easily liable to Inflammations, they are not so proper for the Operation as the Muscular Parts, because of the dangerous Symptoms that may possibly arise in some. There are few or none that make use of the Pus extracted from any who have this Disease by *Transplantation*; but this, being of a milder Disposition, (I am very inclinable to believe) will be as proper as any other. Sometimes they make only one Wound, and infill in this a Drop or two, and this has prov'd as effectual in producing the Disease, as when several had been made: And it has been observed, that all who have undergone the Operation, excepting some, and these but very few, have had the *Pox*: And that those few who have escaped them upon *Inoculation*, have laboured under them when they have been *Epidemical*: But that those who have had them by *Transplantation*,
have

have never after been affected with them through the whole Course of their Life.

THE *Regimen* prescribed after the Operation of *Ingrafting*, is as follows: The Patient is ordered to be confin'd to his Chamber, and to keep his Bed. His Diet, thro' the whole Course of the Disorder, is to be adjusted according to the Nature of the Disease, the different Temperament, the Constitution and other Circumstances of the Patient. He is directed to abstain from Wine and all other things that are apt to inflame the Blood, not only during the several Periods of the Disease, but also for some after. In *Constantinople* and *Venice*, 'tis observable, that they Religiously forbear the Use of *Flesh* and *Broths* for the Space of twenty five or thirty Days. Some who have been obstinate and given small Regard to those several Directions, indulging themselves in some unallowable

able Liberties, have hereby been exposed to a variety of very dangerous Symptoms, which have sometimes prov'd fatal, viz. violent Hæmorrhages; difficult Respiration, Phrensies, Deliriums, Peripneumonies, Stranguries, bloody Urine, Fluxes of the Catamenia, Diarrhæas, Dysenteries and the like; all which were the Consequences of their irregular Conduct, and no way depending upon the real Genius of the Disease.

WHEN the Operation has been duly perform'd in a proper place, namely, in some of the Muscular parts; the Course of the Disease has been after this manner: Upon the first Invasion, the Symptoms which were mentioned in the History of the Small-Pox (as occurring in this Stage of the Disease) have been very few, and so slight and inconsiderable that the Patient has scarcely been sensible, that he was disorder'd; for the strong Propensity

pensity to vomit, the Restlessness and the
 Pains affecting the Loyns, Sides, Back
 and Head, were so Trivial, that small
 Notice were taken of them, unless the
Epidemical Constitution of the Season
 rendred the Pox very *Malignant*; or
 unless the *Particular* Constitution, Tem-
 perament, or ill Habit of the Patient's
 Body heighten'd the Symptoms, and
 made them of a more violent Nature.
 However, although in these Cases they
 were more severe than ordinary, yet
 they were far inferiour even in this
 respect to those that appear'd in o-
 thers, who were seized by the com-
 mon Contagion. According to the Na-
 ture of the Symptoms in this first Stage
 of the Distemper, such was their Genius
 through the whole Course of the Dis-
 order, which when rais'd by the Me-
 thod of *Inoculation*, has always been ob-
 served to be of a much shorter Date,
 than when it has appeared in the com-
 mon Way. In *Constantinople* they find
 that the Eruption generally happens
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on the *Seventh Day*, and but very seldom if ever on the *First*. But in this Period, as well as in the former, there is also a Difference observable, for according to the Constitution of the *Epidemical Season*, and according to the Temperament of the Patient, they appear either sooner or later. The Parts constantly affected are the Places where the Wounds were made, and the *Morbific Pus* instill'd, in which arise sometimes Pustles, which, as well here, as in all the other parts where they appear, are, upon Maturation, fill'd with a Sanious, but not a purulent Matter, as in the common Sort; and sometimes Aposthems, which speedily tend to Suppuration; the number of the pustles ensuing upon this Operation, are but very few, seldom or never exceeding above an hundred in number, and these are always of the *Distinct kind*. Sometimes it happens that they are observed only upon the places where the Incision was made; so that unless the

Face.

is chosen by the Operator, this part has been entirely free.

AFTER the Maturation, they constantly have been observed to dry up in a very short time, and are also attended with this particular Advantage, that after their falling off, the scurffy Scales that ensue are not of that sharp corrosive Nature, which is found in this Disorder, when rais'd in the common manner, from whence the deep Pock-holes, *Contractions of the Skin, unseemly Scars and Seams* consequent upon this Distemper take their Original: For no one has been found any way pitted or otherwise disfigured upon whom the Operation has been performed. Neither are the Patients liable to any of the unhappy Disorders that affect others after the Disease has run through all its Stages, such as the *Weakness of the Eyes, Pearls, Blindness, Diseases of the Head, Cachectic Habit,* and others already mentioned. Be-

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sides all these, there is another Advantage, viz. That it always is attended with desired and surprizing Success as far as has been hitherto observed from the first Introduction of the Method till this time. For there has not been any Constitution of the Air, Season of the Year, Temperament, Age or Sex of the Patient, in which the *Inoculated Small-Pox* have been discover'd to prove destructive. These, if I am not very much mistaken (being a real Matter of Fact) may be a sufficient Encouragement to all, especially the *Fair Sex*, to endeavour to have this Method introduced and practis'd in this Kingdom; as also to the Physicians to direct their Friends and Acquaintances to admit of the Operation. If any doubts this Relation, the Truth of all may fully appear by the different Accounts given of this Method in the *Philosophical Transactions* of the *Royal Society*, Number 339, and 347. As also by the Relations of such as have seen the Operation performed, observed

ved the several Stages of the Disorder, and conversed with such Patients some considerable time after they have been freed from the Disease ; or, *Lastly*, by those who have been fully informed of the whole Affair, by such Witnesses, namely, the ingenious Dr. *Daniel Turner*, and several others in this City.

IT now remains that we proceed to attempt some Rational Account of the Manner in which this Disease is produced in a Humane Body, and to give some Reason why it is of a milder Nature and Disposition when ingrafted, than when it happens to invade any other way ; and these I shall dispatch in as few Words as possible. There is a prodigious Variety of Opinions among Authors concerning the Causes of this Disorder ; each of which, following the Dictates of his own Judgment, strives to support his own *Hypothesis*, with the most plausible Arguments he can produce. *Willis* maintains, That the *Taint* is first communicated by the *Menstrual Blood* to the
Fœtus,

Fætus, and that the Seeds of this Disease received from thence are deposited in the Brain and Spinal Marrow, which being rous'd by some Accident, impress the *Infection* first upon the Spirits, and by them communicate it to the Blood. But this Account is so Unphilosophical and unworthy so great a Man, that I am surprized such a Master of Reasoning could propose any thing of the like Nature. For since nothing that has any the least Appearance of an Argument can be offered, to prove that the *Infection* should be conveyed first to the Solid Parts, when he himself acknowledges that the *Taint* arises from the *Menstrual Fluid*, and that the Brain and Spinal Marrow should rather be the Seat of these Seeds, since they are not the nearest the Source, or Canals from whence the *Nutritious* Blood is conveyed: It must be allowed, that the whole is only an imaginary Notion, framed to explain a Matter, of which he had no just Conceptions. Again,
since

since the *Menstrual* Blood is not in any
 Secretion from the Womb by means of
 a *Ferment* ; the Impossibility of which
Chimera has been demonstrated by the
 Learned and Ingenious *Bellini, Borelli,*
 and *Pitcairne* ; but of the same kind in
 all respects with the remaining Mass,
 it cannot with any probability be sup-
 posed that this should be any more in
 Fault than the rest. In the next Place,
 if these Seeds be deposited in the Brain,
 or Spinal Marrow, they must be sup-
 posed to be contained either in the Sub-
 stance of the Nerves, or in their Cavi-
 ty : If in the former, they certainly
 must, by their particular Figure, Soli-
 dity, and Gravitation or accidental
 Motion, make some Impression upon
 those sensible Parts ; and consequently
 occasion manifold Disorders, nothing
 of all which is perceived, till immedi-
 ately before the *Invasion* : If in the lat-
 ter, I am apt to believe, that there
 are very few, who can think that their
 Force is of such Importance as to be
 able to resist the Impulse and Explosion
 of

of the Spirits as he is pleased to express himself, so as not to be hurried along with them much sooner into the Mass of Blood. *Lastly*, It seems very improbable, supposing the Brain and Spinal Marrow to be the Seat of these Seeds, that the Spirits, which are of such a subtle nature, should continue for such a tract of time, without any the least Disturbance from any these Malignant Seeds; when the Source of the former, and the Seats of the latter, are so very contiguous to one another.

LISTER is of opinion, that this Disease derived its first Original from the bite of some venomous Creature, from which Infection the Contagion is propagated by Hereditary Descent from one to another; and for the confirmation of this he produces a variety of Instances, wherein Symptoms, of the like nature with those appearing in the *Small-Pox*, take their Rise from the bites of venomous Animals. Others suppose, that it depends intirely upon a particular Constitution of the Air, without

without any the least concurrences of a latent *Seminium*. But this, if I mistake not, has not any greater semblance of probability than the other now mentioned. *First*, because then they would never appear, but when they are Epidemical, which is a plain contradiction to common Observation. And *Secondly*, because then they might several times invade the same Person, namely, when the like constitution of the Air happens to be predominant; but this also is contrary to repeated Observations: for 'tis surprisingly rare that the same Person labours a Second time under this Disorder; and if ever this does happen, it proceeds either from Malpractice, or some accidental disposition of the Body, by which the Efforts of nature were interrupted, and part of the *Morbific* Seeds were retain'd within. *Lastly*, the Generality are inclinable to think that 'tis most probable that the *Luxurious* and *Intemperate Manner* of living, us'd by the *European Women* during the time of their being with

with Child, first created the Seeds of this Disease in the fluid and solid parts of the *Fœtus*: where they lie dormant and unactive, till such time as they are set in motion and actuated either by the natural Disposition of the Body, the particular Temperament of the Air, or the contagious *Effluvia* arising from Infected persons and influencing Bodies duely predisposed. Upon the whole, I must acknowledge that I know not the *Procatastatic* cause of this Disease; for not being furnished with a particular Account of the time wherein it first appeared, and consequently not of the remote Causes then influencing; the Decisions of any about this Matter are only Conjectures, founded on no fixt and certain Principles, which are absolutely necessary for forming a Demonstration.

WE now begin to enquire after the *Immediate Cause* of this Distemper: and this we find is generally supposed by the Moderns to be a *Fermentation* or intestine motion or Ebullition in the Blood,

Blood, arising from the Mixture of Heterogeneous Particles ; by means of which, separation is made, and the noxious Bodies are eliminated thro the Pores of the Skin. This was the Opinion of the *Arabians*, namely *Razes*, *Mesue*, and *Avicenna*, who were the first that attempted to give a rational account of the Matter. And it has found such reception among the Moderns, that they have not only embraced and taken great pains to illustrate it, but have also contended to be esteemed the Authors of it. Upon a fair Examination of the Matter, I am inclinable to believe, that it can be demonstrated 'tis impossible that such an Ebullition, *Fermentation*, or Intestine Motion can arise in a Circulating Fluid. For since, according to the Laws of Nature, all Bodies continue in their state of Rest or Motion according to the Direction given, unless it be alter'd by a Superior force, and since the Change of Motion is always proportionable to the moving power impress ;

'tis absolutely necessary that the Activity, Force and Power of the Morbific or contagious *Effluvia*, acting upon the Mass of Blood, should be superior to the Projectile force of the Heart, the Contractile power of the Vessels, and the Pressure of the *Atmosphere* dilating the Lungs, and influencing the Diaphragm, the Intercoastal and Abdominal Muscles joyn'd together; But since the power of any one of these is so very considerable, as has been fully demonstrated by *Bellini*, *Borelli*, and *Pitcairne*, 'tis contrary to Reason to imagine, that the Power of those subtile Particles should be of such Moment, as to resist the Impulse given, and at the same time introduce a Motion different from the common Direction. For seeing all Force is in a Compound *Ratio* of the Solid Particles of which the Body Impelling is composed, and the Velocity with which it moves; It is as evident, as that the Three Angles of a Rectilineal Triangle

gle are equal to two Right Angles, that the Sum of the latter is not to the Sum of the former, as one to Five Thousand : because all Qualities propagated from the Center in Right Lines decrease in a Duplicate Ratio of the increas'd Distance from the same Center ; It therefore follows, that the Doctrine of a *Fermentation*, Ebullition or Intestine motion, in a Circulating Fluid must unavoidably fall to the Ground.

SINCE then it is demonstrated that the Fermentation, or intestine Motion arising upon the Mixture of the *Heterogeneous* Particles, proposed by the *Arabians*, and embraced by the *Moderns*, is contrary to Reason and the established Laws of Nature ; another is to be found out which may be conformable to both. For since the Subject Acted upon and the Cause Acting are both material Beings, they must of Necessity be obnoxious to the same Laws that all other Bodies are subjected to. Now since all force of Bodies Acting upon

one another is in a Compound *Ratio* of the Quantity of Matter contained, the particular Figure of which they consist, and the different Degree of Velocity with which they move : And since we are not furnished as yet with any Methods proper for determining with Certainty these, or any of these ; it is plain that no Proof can be made of this *a priori*, as 'tis usually expressed, but it must be taken *a posteriori*, or from the Effects that arise. That the Morbific Matter, received into the Mass of Blood, consists of such attractive Force, as to be able to alter its *Crisis*, and produce such irregular Combinations of the *Globules* of which it is composed, that their Diameters are so far enlarged as to be incapable of passing thro' the *Capillary Vessels* of the extream Parts, upon which their Motion is retarded, and their Course obstructed, seems to me very plain by the Sense of Cold, the Shivering and Shaking, which are always observed upon the first Invasion of this Disorder.

FOR

FOR the Blood not circulating freely thro' these Parts, such a Chilliness, and Cold must of necessity arise; these are followed with a quick and high Pulse, and lastly, a Feverish and sharp Heat, which ensue; in that the Blood not passing to the Extremities, and consequently the way being shorter, the Return must be quicker, whereon the Spirits are more speedily emitted into the *Fibrilla* of the Heart, whence arises a stronger and more impetuous Contraction of this Muscle and Dilatation of the Arteries, and consequently a Fever, and all the several Symptoms attending it. All these continue till such time as the enlarg'd *Globules* by this accelerated and violent Agitation and Contraction of the Heart, the Elasticity of the Vessels, the Action of the *Muscles*, and the Pressure of the *Atmosphere* upon the Lungs are rendred so small, that they readily circulate thro' the most minute *Capillaries* and easily, the various *Obstacles*, that opposed their Passage, close to the Pores, and stop
the

the Extremities of the Vessels. Upon this the superfluous morbid Particles are readily discharged and eliminated from the Mass of Blood to the Surface of the Body : But being as yet too gross to pass thro' the condens'd Scarf-Skin, they distend and raise it up into little Bladders or Pustles, which gradually increase in Number, Height and Circumference, according to the different Discharge of this Matter, which being confined separate from the circulating Mass, must by Degrees partly by Warmth, and partly by a continual Loss of the most subtil and active Particles which constantly transpire, be turned into Pus, dry up and scale off. *Whereas* the remaining Part, which, because of the *Exsiccation*, could not be push'd out into those Pustles, is in Adults by the Force of Nature thrown out through the Salival Glands, and in Children by a Diarrhæa.

FROM what has been propos'd in relation to the immediate Cause, it may evidently appear that the whole
Dif-

Difference of the Symptoms of the *Small-Pox*, arising in the common way and of those which are ingrafted, depends partly on the different quantity, and partly on the different Activity of the *Morbific Matter* in those different Circumstances. In the former they are very considerable, but in the latter being but slight and trivial for the following Reasons; viz. 1. Because in the former Case, the most subtil, contagious *Effluvia* are received into the Body. 2. Because these very *Effluvia* are attenuated and set in Motion, partly by the Agitation of the Air, and partly by the Rays of Light proceeding from the Body of the Sun. 3. Because these infectious *Effluvia* are at several times intermixed with the Mass of Blood through several Parts; namely, The whole Surface of the Body, the *Aspera Arteria*, the Lungs and the Stomach: And Lastly, Because the Patient's Body is no way prepared to oppose the Assaults of those Active Particles. The contrary of all which happens in the Method

thod of *Ingrafting*; for in this the gross and inactive *Pus*, without any the least Exaltation, is at one and the same time intermix'd with the whole Mass of Blood, in a Body which is duly prepared and rendred capable to resist the strongest Efforts that the Morbific *Effluvia* can make.

THE Effects of the Energy must be very various. For when in this unactive State, the Matter is immediately intermix'd with the whole Mass, the Resistance of the *Globules* of the Blood is such, that they are neither so readily, nor so universally united together; upon which the *Incrassation* being smaller, the Fever is less, the Eruption slower, the Discharge not so considerable, the Maturation quicker, the Exsiccation more speedy, and consequently the whole Habit of the Body in a more healthful State.

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